REMARKS

Applicant respectfully requests reconsideration and allowance of the subject application. Claims 1, 12 and 21 are amended. No claims are added or canceled. Claims 1-26 are pending in this application.

35 U.S.C. § 102

Claims 1, 8, 9, 11, 12, 17, 19, 21 and 24

Claims 1, 8, 9, 11, 12, 17, 19, 21 and 24 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Number 5,781,896 issued to Dalal (hereinafter "Dalal"). Applicant respectfully traverses the rejection.

(Claim 1) It is initially noted that the current amendment to claim 1 that is contained in the body (as opposed to the preamble) of the claim restores claim 1 to the original wording and substance thereof. After further review of the rejections and references, Applicant has determined that the prior amendment to the substance of claim 1 was unnecessary.

Claim 1 recites "a method for processing a database query," comprising: "partially pre-aggregating records in a database according to at least one grouping column" "to provide a result that contains at least two records having like grouping column values." Claim 1 also recites the step of "aggregating records derived from the partial pre-aggregation to provide a result that contains records having unique grouping column values."

Partial aggregation is defined in the specification (p. 15):

> [T]he output stream from pre-aggregation may contain multiple records related to the same customer, each one covering a subset of that customer's invoices. Traditional, complete aggregation always outputs a single record for each customer. This is the difference between *partial* pre-aggregation and pre-aggregation.

A partial aggregation (or pre-aggregation as used in the example) is an incomplete aggregation, so to speak, that may be performed as a preliminary step in a database query. Normally after an aggregation is completed, no two records contain a grouping column value that is the same as the grouping column value of another record.

It is Applicant's assertion that the Dalal reference does not disclose or anticipate such a scheme.

The Office Action, in response to Applicant's previous arguments (see Heading 6.) states that "multiple aggregation query in Dalal is a query that utilized more than one grouping column, aggregating one grouping column at a time, sequentially – this is clearly partial aggregation (citation omitted).

Applicant points out that the process disclosed and described in Dalal is a process that is well known in the art and referred to as a "group by with rollup" operation. The "group by with rollup" operation is supported by all major databases in the art. The "group by with rollup" operation may also be referred to as "grouping sets" (at least in SQL).

Fig. 11 of Dalal is an explicit example of a "group by with rollup" operation, even though not specifically referred to as such in the reference. Fig. 11 can be described as performing a "group by" operation on the 'Salesperson' column and, subsequently, performing a "rollup" operation on the 'Division' column. In other words, the "rollup" operation means that the Level 1 Result Tables are grouped by 'Division'. As a practical matter, the operation described by Fig. 11 comprises two consecutive grouping operations.

Dalal does *not* disclose or anticipate only *partially* aggregating each grouping column. The examples shown and described in Dalal clearly indicate

that a full aggregation is performed on the grouping columns because after each aggregation, each grouping column value in the grouping column that was aggregation is unique, i.e. no two grouping column values are alike.

If the example shown in Dalal is applied to claim 1, then a first partial pre-aggregation on the "Salesperson" grouping column would produce a result that contained non-unique grouping column values. But this is not the case in Dalal, since each "Salesperson" value in Fig. 11 is unique.

Subsequently, another aggregation referenced above would be performed on the partial pre-aggregation result, so that each grouping column value was unique in the final result. This subsequent aggregation is a complete aggregation as is known in the art and described in the specification.

Continuing with the hypothetical, after the "Salesperson" group has been completely aggregated, a second partial pre-aggregation on the "Division" grouping column would produce a result that contained non-unique grouping column values. Again, this is not shown in Fig. 11 (or in Dalal in general) because the "Division" column of the Level 2 Result Table contains only unique values.

After the partial pre-aggregation is complete, then a second complete aggregation would be performed on the partial pre-aggregation result, so that each grouping column value was unique in the final result.

In summary, the "group by with rollup" operations (referred to in Dalal as a "multiple-level aggregation") disclosed in Dalal is not a partial aggregation. As a matter of logic, the aggregations included in the multiple-level aggregation must be performed sequentially. However, the described operation – whether referred to as a "group by with rollup" or as a "multiple-level aggregation") does not rise to the partial pre-aggregation that is required by claim 1.

Accordingly, claim 1 is not anticipated by Dalal and is allowable over the cited reference. The rejection, therefore, should be withdrawn.

Claims 8, 9 and 11 depend from claim 1 and are allowable by virtue of that dependency.

Claim 12 recites a relational database system that includes, *inter alia*, a record store and a query processor configured "to process a query on the record store according to at least one grouping column, the query processor being configured to partially pre-aggregate the record store to provide a result that contains at least two data records that have like grouping column values."

It is again noted that – similar to claim 1 – the current amendment to claim 12 substantially restores claim 12 to its original language. After further review of the references, Applicant has determined that the previous amendment language is unnecessary to distinguish the disclosed invention from the cited references.

As previously discussed in the response to the rejection of claim 1, a typical aggregation does not result in any two records having an identical grouping column value as required by claim 12. The operations referred to in Dalal are sequential aggregations - one follows the other. But these sequential aggregations are two independent, complete aggregations – neither of the sequential aggregations is a partial aggregations.

Also, the previous discussion of how Dalal merely discloses a "group by with rollup" operation that is well known in the art also applies to claim 12, since claim 12 requires a partial pre-aggregation operation.

Therefore, Dalal does not disclose or anticipate a partial aggregation or partial pre-aggregation. As a result, claim 12 is allowable over the cited reference and the rejection thereof should be withdrawn.

Claims 17 and 19 depend from claim 12 and are allowably at least by the same reasoning discussed in the response to the rejection of claim 12. Therefore, the rejection of claims 17 and 19 should also be withdrawn.

Claim 21 recites a relational database computer program that comprises "partial pre-aggregation code to partially pre-aggregate data records according to grouping column values in a single grouping column to provide a partial pre-aggregation result having two or more records having like grouping column values." The relational database computer program also includes "aggregation code" that aggregates the result of the partial pre-aggregation.

Again, it is noted that – similar to claims 1 and 12 – the current amendment to claim 21 substantially restores claim 21 to its original language. After further review of the references, Applicant has determined that the previous amendment language is unnecessary to distinguish the disclosed invention from the cited references.

As previously discussed, Dalal merely discloses a "group by with rollup" operation (i.e. a multiple level aggregation) that does not include partial aggregation. Therefore, Dalal does not disclose or anticipate a partial pre-aggregation operation as required in claim 21. .

Accordingly, claim 21 is allowable over the cited references and the rejection of claim 21 should be withdrawn.

Claim 24 recites a relational database computer program comprising computer-executable instructions that perform several steps. The steps include "aggregating the input records in the stream according to a single grouping column" to create a record store, "joining records in the record store with other data," outputting the records from the join and aggregating the records output from

the join. Claim 24 also makes clear that "the records output from the join include at least two records that have an identical grouping column value in the single grouping column." This restriction, in essence, renders the first aggregating step a partial aggregation.

As previously discussed, the cited reference only describes an aggregation, a multiple level aggregation, and/or a "group by with rollup" operation wherein no records output from an aggregation contain an identical value in the grouping column. The identical values cited in the Office Action are contained in a grouping column on which the aggregation was not performed. The operations disclosed in Dalal are merely typical aggregations that completely aggregate records on a grouping column so that no record resulting from the aggregation contains an identical value in the aggregated grouping column. This is contrary to claim 24. After a first complete aggregation is performed, a second complete aggregation is performed on another grouping column.

Claim 24 clearly recited a partial aggregation that is not disclosed in any reference. As a result, claim 24 is allowable over Dalal and the rejection thereof should be withdrawn.

35 U.S.C. § 103(a)

Claims 2-5, 13-15, 20, 22, 23 and 25

Claims 2-5, 13-15, 20, 22, 23 and 25 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Dalal in view of U.S. Patent Number 6,115,705 issued to Larson (hereinafter "Larson"). Applicant respectfully traverses the rejection.

Claims 2-5 depend from claim 1 and are allowable at least by virtue of that dependency for the reasons stated in the response to the rejection of claim 1. Neither reference teaches or suggests a partial aggregation or partial pre-

aggregation. As discussed above, this makes the claims allowable over the cited references and the rejection of these claims should be withdrawn.

Claims 13-15 and 20 depend from claim 12 and are allowable at least by virtue of that dependency for the reasons stated in the response to the rejection of claim 12. The addition of Larson does not add anything to the previous discussion because Larson does not teach or suggest partial aggregation or partial pre-aggregation.

Accordingly, the rejection of claims 13-15 and claim 20 should be withdrawn.

Claims 22 and 23 depend from claim 21 and are allowable at least by virtue of that dependency for the same reasons set forth in the response to the rejection of claim 21, above. Accordingly, the rejection of these claims should be withdrawn.

Claim 25 depends from claim 24 and is allowable at least by virtue of that dependency for the same reasons set forth in the response to the rejection of claim 24, above. Accordingly, the rejection of claim 25 should be withdrawn.

Claims 6, 7, 10, 16, 18 and 26

Claims 6, 7, 10, 16, 18 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dalal in view of Larson and further in view of U.S. Patent Number 6,032,144 to Srivastava et al. (hereinafter Srivastava). These claims depend from claims that have been shown, above, to be allowable over Dalal. The addition of Larson and/or Srivastava to the analysis does not provide a reference that teaches or suggests partial aggregation or partial pre-aggregation.

Accordingly, these claims are allowable over the cited references and the rejection thereof should be withdrawn.

Conclusion

All pending claims 1-26 are in condition for allowance. Applicant respectfully requests reconsideration and prompt issuance of the subject application. If any issues remain that prevent issuance of this application, the Examiner is urged to contact the undersigned attorney before issuing a subsequent Action.

Respectfully Submitted,

Date: 5/23/03

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